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IS 9256-2 (1979): Fixed Metallized Polyester Film Dielectric Capacitors, Part 2: Type FCPM 1 [LITD 5: Semiconductor and Other Electronic Components and Devices]

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IS : 9256 (Part II) - 1979

(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR FIXED METALLIZED POLYESTER FILM DIELECTRIC CAPACITORS

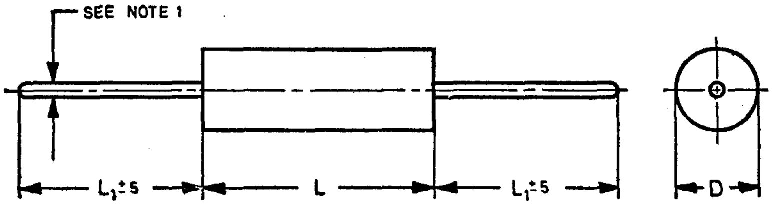
PART II TYPE FCPM 1

0. General — This standard shall be read in conjunction with IS : 9256 (Part I) - 1979 'Specification for fixed metallized polyester film dielectric capacitors: Part I General requirements and methods of tests'.

1. Scope — Covers fixed metallized polyester capacitors, tubular, non-hermetically sealed in non-metal case, insulated, tapewrapped and filled or moulded type.

2. Outline, Drawing and Dimensions — The outline drawing and dimensions shall be according to Fig. 1 and Table 1.

3. Ratings — Ratings shall be as specified in Table 1.



All dimensions in millimetres.

Typical Construction: Non-hermetically sealed, tape wrapped and filled or moulded.

Note 1 — Terminations are of diameters $0{\cdot}60^{+0{\cdot}06}_{-0{\cdot}05}$ mm for $D<8$ mm and $0{\cdot}8^{+0{\cdot}08}_{-0{\cdot}05}$ mm for $D>8$ mm.

Note 2 — L_1 is 40 mm for $L \leqslant 15$ mm, 45 mm for $L \leqslant 27$ mm and 50 mm for $L \leqslant 32$ mm.

FIG. 1 OUTLINE DRAWING AND DIMENSIONS

4. Characteristics

a) Selection tolerance	± 5 percent, ± 10 percent
b) Stability	± 5 percent
c) Vibration	10 — 2 000 Hz, 200 m/s²
d) Pump	4 000, 40 *g*
e) Shock	1 km/s²
f) Acceleration	1 km/s²
g) Low air pressure	1 kPa
h) Climatic category	55/125/56

5. Marking — *See* **7** of IS : 9256 (Part I) - 1979.

6. Material, Construction and Workmanship — *See* **5** of IS : 9256 (Part I) - 1979.

7. Classification of Tests — *See* **8.1** of IS : 9256 (Part I)-1979.

7.1 *General Conditions for Tests* — *See* **8.2** of IS : 9256 (Part I)-1979.

7.2 *Schedule of Type Tests* — Test schedule and the specific requirements shall be in accordance with Table 2.

Adopted 30 August 1979

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[redacted] Gr 3

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Capacitors Sectional Committee, LTDC 15; Fixed Capacitors Subcommittee, LTDC 15 : 1 [Ref : Doc : LTDC 15 (337)]

TABLE 1 DIMENSIONS AND RATINGS

(*Clauses* 2 *and* 3)

Capacitance (μF)	Rated Voltage									
	63V DC		100V DC		250V DC		400V DC		630V DC	
	L	*D*	*L*	*D*	*L*	*D*	*L*	*D*	*L*	*D*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0·001	—	—	—	—	—	—	—	—	10±1·0	4·5±1·0
0·001 5	—	—	—	—	—	—	—	—	10±1·0	4·5±1·0
0·002 2	—	—	—	—	—	—	—	—	10±1·0	4·5±1·0
0·003 3	—	—	—	—	—	—	—	—	10±1·0	4·5±1·0
0·004 7	—	—	—	—	—	—	—	—	15±1·5	5 ±1·0
0·006 8	—	—	—	—	—	—	10±1·0	4·5±1·0	15±1·5	5 ±1·0
0·01	—	—	—	—	—	—	10±1·0	4·5±1·0	15±1·5	5 ±1·0
0·015	—	—	—	—	10±1·0	4·5±1·0	15±1·5	5 ±1·0	15±1·5	5·5±1·0
0·022	—	—	—	—	10∓1·0	4·5±1·0	15±1·5	5 ±1·0	15±1·5	6 ±1·0
0·033	—	—	—	—	15±1·5	5 ±1·0	15±1·5	5·5±1·0	19±1·5	6 ±1·5
0·047	—	—	—	—	15±1·5	5 ±1·0	15±1·5	6 ±1·0	19±1·5	6·5±1·5
0·068	—	—	10±1·0	4·5±1·0	15±1·5	5 ±1·0	19±1·5	5·5±1·5	19±1·5	7·5±1·5
0·10	10±1·0	4·5±1·0	15±1·5	5 ±1·0	15±1·5	5·5±1·0	19±1·5	6 5±1·5	27±2·0	7 ±1·5
0·15	10±1·0	5 ±1·0	15±1·5	5 ±1·0	15±1·5	6·5±1·0	19±1·5	7·5±1·5	27±2·0	8·5±1·5
0·22	15±1·5	5 ±1·0	15±1·5	6 ±1·0	15±1·5	7·5±1·0	27±2·0	7 ±1·5	27±2·0	10 ±1·5
0·33	15±1·5	5·5±1·0	15±1·5	6·5±1·0	19±1·5	7 ±1·5	27±2·0	8·5±1·5	32±2·0	11 ±2·0
0·47	15±1·5	6·5±1·0	19±1·5	6 ±1·5	19±1·5	8 ±1·5	27±2·0	10 ±1·5	32±2·0	13 0±2·0
0·68	19±1·5	5·5±1·5	19±1·5	7 ±1·5	27±2·0	7·5±1·5	32±2·0	10·5±2·0	32±2·0	15·5±2·0
1·0	19±1·5	6·5±1·5	19±1·5	8·5±1·5	27±2·0	9 ±1·5	32±2·0	12·5±2·0	32±2·0	18·5±2·0
1·5	19±1·5	8 ±1·5	27±2·0	8·5±1·5	27±2·0	10 5±1·5	32±2·0	15·5±2·0	—	—
2·2	27±2·0	8 ±1·5	27±2·0	10 ±1·5	32±2·0	11·5±2·0	32±2·0	18·5±2·0	—	—
3·3	27±2·0	9·5±1·5	27±2·0	12 ±1·5	32±2·0	14 ±2·0	—	—	—	—
4·7	27±2·0	11 ±1·5	32±2·0	13 ±2·0	32∓2·0	16·5±2·0	—	—	—	—
6·8	32±2·0	12 ±2·0	32±2·0	15·5±2·0	32±2·0	19 5±2·0	—	—	—	—
10·0	32±2·0	14·5±2·0	32±2·0	18·5±2·0	—	—	—	—	—	—

TABLE 2 TEST SCHEDULE AND REQUIREMENTS

(*Clause* 7.2)

Sl No. (1)	Test (2)	Clause Ref in IS : 9256 (Part I)-1979 (3)	Condition of Test (4)	Requirement (5)
I)	*Group 0*			
	a) Visual examination	8.4.1	—	The condition, workmanship and finish shall be satisfactory. Marking shall be legible
	b) Dimensions	8.4.2	—	The dimensions of capacitors and their terminations shall be in accordance with Table 1 and Fig. 1
	c) Capacitance	8.3.2	—	The capacitance value shall correspond with the rated capacitance value taking into account the tolerance
	d) Tangent of the loss angle	8.3.3	—	The tangent of the loss angle shall not exceed 0·01
	e) Outer foil marking	8.3.5	—	The marking indication of outer foil shall correspond correctly with the termination which is connected to outside electrode foil
	f) Inductance	8.3.6	—	The inductance shall not be greater than the inductance of a wire 0·2 mm in diameter and of a length equal to that of capacitor and its leads
	g) Voltage proof	8.3.1	—	There shall be no breakdown, spark or flashover
	h) Insulation resistance	8.3.4	—	As in 8.3.4.3 of IS : 9256 (Part I) - 1979
	j) Sealing	9.1	—	—
II)	*First Group*			
	a) Solderability	8.4.4.1	—	There shall be no visible damage
	b) Robustness of termination	8.4.3	—	There shall be no visible damage
	c) Bump	8.4.6	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 1 percent
	3) Tangent of loss angle	8.3.3	—	Tangent δ shall not exceed 0·001
	4) Insulation resistance	8.3.4	—	As in Group 0
	d) Vibration	8.4.5	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 1 percent
	3) Tangent of loss angle	8.3.3	—	Tangent δ shall not exceed 0·001
	4) Insulation resistance	8.3.4	—	As in Group 0

(*Continued*)

TABLE 2 TEST SCHEDULE AND REQUIREMENTS — *Contd*

Sl No.	Test	Clause Ref in IS : 9256 (Part I)-1979	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
	e) Shock	8.4.7	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 1 percent
	3) Tangent of loss angle	8.3.3	—	Tangent δ shall not exceed 0·001
	4) Insulation resistance	8.3.4	—	As in Group 0
	f) Acceleration	8.4.8	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 1 percent
	3) Tangent of loss angle	8.3.3	—	Tangent δ shall not exceed 0·001
	4) Insulation resistance	8 3.4	—	As in Group 0
	g) Rapid change of temperature	8.5.3	—	—
	1) Visual examination	8.4.1	—	There shall be no visible damage
	2) Capacitance	8.3.2	—	Change of capacitance value shall not exceed ± 5 percent
	3) Tangent of loss angle	8.3.3	—	Tangent δ shall not exceed 0·001
	4) Insulation resistance	8.3.4	—	As in Group 0
	h) Climatic sequence	8.5.1	—	—
	1) Dry heat	8.5.1.2	—	—
	i) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
	ii) Insulation resistance	8.3.4	—	IR 50 MΩ for $C \leqslant 0{\cdot}33\ \mu F$ RC 10s for $C > 0{\cdot}33 \mu F$
	2) Damp heat (accelerated) first cycle	8.5.1.3	—	—
	3) Cold	8.5.1.4	—	—
	i) Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 5 percent
	4) Low air pressure	8.5.1.5	—	There shall be no sign of breakdown or flashover, harmful deformation of the case
	5) Damp heat (accelerated remaining cycles)	8.5.1.6	—	—
	i) Visual examination	8.4.1	—	There shall be no visible damage and marking shall be legible
	ii) Voltage proof	8.3.1	—	There shall be no breakdown, spark or flashover
	iii) Insulation resistance	8.3.4	—	Not less than 50 percent of the value given in Group 0
	iv) Capacitance	8.3.2	—	Capacitance change shall not exceed ± 5 percent
	v) Tangent of loss angle	8.3.3	—	Tan δ shall not exceed 0·001

(*Continued*)

TABLE 2 TEST SCHEDULE AND REQUIREMENTS — *Contd*

Sl No.	Test	Clause Ref in IS : 9256 (Part I)-1979	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
III)	*Second Group*			
	a) Damp heat (long term)	8.5.2	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Voltage proof	8.3.1	—	There shall be no breakdown, spark or flashover
	3) Insulation resistance	8.3.4	—	Not less than 50 percent of the value given in Group 0
	4) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
	5) Tangent of loss angle	8.3.3	—	Tan δ shall not exceed 0·001
	6) Solderability	8.4.4.1	—	—
IV)	*Third Group*			
	a) Storage at temperature (cold)	9.4	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance (cold)	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
	b) Endurance	9.2	—	—
	1) Visual examination	8.4.1	—	There shall be no visible damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
	3) Tangent of loss angle	8.3.3	—	Tan δ shall not exceed 0·001
	4) Voltage proof	8.3.1	—	There shall be no breakdown, spark or flashover
	5) Insulation resistance	8.3.4	—	IR shall not be less than half the value specified in Group 0
V)	*Fourth Group*			
	a) Self-healing	8.3.7	—	—
	1) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
VI)	*Fifth Group*			
	a) Mould growth	8.5.4	—	—
VII)	*Sixth Group*			
	a) Resistance to solvents	9.5	—	—
	b) Resistance to steam	9.3	—	—
	c) Resistance to soldering heat	8.4.4.2	—	—
VIII)	*Seventh Group*			
	b) Salt mist	8.5.5	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Voltage proof	8.3.1	—	There shall be no breakdown, spark or flashover
	3) Insulation resistance	8.3.4	—	As in Group 0

EXPLANATORY NOTE

While preparing this standard assistance has been derived from JSS: 50204 'Detail specification for capacitors, fixed, metallised paper/polyester dielectric'. The corresponding JSS pattern is CPMO7.

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